

**Systematics of *Fejervarya limnocharis*
(Gravenhorst, 1829)
(Amphibia, Anura, Ranidae)
and related species.
1. Nomenclatural status
and type-specimens of the
nominal species *Rana limnocharis*
Gravenhorst, 1829**

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A detailed analysis shows that the nominal species *Rana limnocharis* was first made nomenclaturally available by GRAVENHORST (1829), and then a second time and independently by WIEGMANN (1834). The consequences of these facts regarding the name-bearing types of these two nominal taxa are discussed and neotypes are designated for both of them. The status of the following related nominal species are also discussed, and their type-specimens are described: *Rana cancrivora* Gravenhorst, 1829; *Rana vittigera* Wiegmann, 1834; *Rana gracilis* Wiegmann, 1834; *Rana multi-striata* Hallowell, 1861; *Rana wasi* Annandale, 1917. Finally, on the basis of several recent pieces of information, it is suggested that the group of frogs usually known as "*Rana limnocharis* group" or "subgenus *Fejervarya*" should be recognized as a distinct genus, *Fejervarya* Bolkey, 1915.

ABBREVIATIONS

MEASUREMENTS

SVL Snout-vent length

Head

HW Head width.

HL Head length (from back of mandible to tip of snout).

MN Distance from back of mandible to nostril.

MFE Distance from back of mandible to front of eye

MBE Distance from back of mandible to back of eye.

IFE	Distance between front of eyes.
IBE	Distance between back of eyes.
IN	Internarial space.
EN	Distance from front of eye to nostril.
EL	Eye length.
SL	Distance from front of eye to tip of snout.
NS	Distance from nostril to tip of snout.
IUE	Minimum distance between upper eyelids.
UEW	Maximum width of upper eyelid.

Forearm

HAL	Hand length (from base of outer palmar tubercle to tip of third finger)
FLL	Forelimb length (from elbow to base of outer palmar tubercle)

Hindlimb

TL	Tibia length
TW	Maximum tibia width.
FOL	Foot length (from base of inner metatarsal tubercle to tip of fourth toe).
TFOL	Length of tarsus and foot (from base of tarsus to tip of fourth toe).
FL	Femur length (from vent to knee).
MTTF	Distance from distal edge of metatarsal tubercle to maximum incurvation of web between third and fourth toe.
TFTF	Distance from maximum incurvation of web between third and fourth toe to tip of fourth toe.
MFTF	Distance from distal edge of metatarsal tubercle to maximum incurvation of web between fourth and fifth toe.
FFTF	Distance from maximum incurvation of web between fourth and fifth toe to tip of fourth toe.
IMT	Length of inner metatarsal tubercle.
ITL	Inner toe length

MUSEUMS AND PERSONS

AD	Alain Dubois.
AMO	Annemarie Ohler.
FMNH	Field Museum of Natural History, Chicago, Illinois, USA.
MNHN	Muséum National d'Histoire Naturelle, Paris, France
NMW	Naturhistorisches Museum, Wien, Austria.
RMNH	Nationaal Natuurhistorisch Museum, Leiden, Netherlands.
ZMB	Zoologisches Museum, Berlin, Germany.
ZSI	Zoological Survey of India, Calcutta, India.

INTRODUCTION

In most publications dealing with amphibians of south and south-eastern Asia, mention is made of very common small frogs that occur in or around most paddy fields, small ponds and open aquatic habitats of this region, and which are usually known under the name *Rana limnocharis*. Following BOULFANGER's (1920a) work, this group was long viewed as a single species with four subspecies and this species was credited with a very wide distribution, from Pakistan to China and Japan and to Indonesia. However, on the basis of the study of mating calls and morphology, DUBOIS (1975b) showed that, in a very limited region (the small country of Nepal), no less than four distinct species did occur and had been confused under the name *Rana limnocharis limnocharis*. This author later showed that still other species were present in southern India (DUBOIS, 1984b) and suggested that the whole group was composed of at least 15 species, probably many more (DUBOIS, 1987, 1992). He further proposed (DUBOIS, 1984b, 1987, 1992) to remove this group from the genus *Rana* as understood by BOULFANGER (1918, 1920a-b) and to recognize it provisionally as the subgenus *Fejervarya* Bolkay, 1915 of the genus *Limnonectes* Fitzinger, 1843. FEI et al. (1991) and YE et al. (1993) elevated this group to the rank of genus, but incorrectly under the generic name *Euphlyctis* Fitzinger, 1843 (a name which in fact applies to another group of species from the Indian region, that are much more aquatic than *Fejervarya* and that retain a lateral-line system in adults, see DUBOIS, 1992). Finally, DUBOIS (2000), ISKANDAR (1998, 1999), FEI (1999) and MARMAYOT et al. (2000) considered *Fejervarya* a distinct genus.

Within this frame, a question arises: to which species does the specific name *Rana limnocharis* apply? DUBOIS (1984b) suggested that it applies to populations of Java (from where the species was first described) and possibly of other regions, but that more work was necessary to establish the range of the "true" *Rana limnocharis*. The electrophoretic and morphometric data of TODA et al. (1998) and of VEITH et al. (2000) complicate this situation, as they show that two different species of this group live in Java. Which one should bear the name *Rana limnocharis*? Answering this question requires the clarification of the nomenclatural status and authorship of the name *Rana limnocharis*, to establish whether type-specimens of this nominal species can be identified and studied, and, if the answer to the last question is negative, to designate and describe a neotype for this taxon.

THE QUESTIONS

A great confusion exists in the literature regarding the nomenclatural status and author of the name *Rana limnocharis*. This name has been credited so far with seven different authorships, (1) "Kuhl" (without reference to a published text), (2) "Boie" (without reference to a published text), (3) WILGMANN (1834, often miscited as "1835" see ZHAO & ADLER, 1993: 411-412), (4) Boie in WILGMANN (1834), (5) Kuhl in GRAVENHORST (1829), (6) GRAVENHORST (1829), (7) Boie in GRAVENHORST (1829).

(1) The name *Rana limnocharis* first appeared in GRAVENHORST (1829: 42), who credited it to "Kuhl" and stated that this was a manuscript name appearing in an unpublished manuscript by Boie, where a closely related species was also described under the name *Rana cancrivora*.

(2) Shortly after, several authors (WAGLER, 1830: 203, TSCHUDI, 1838: 79, DUMÉRIE & BIBRON, 1841: 376, 379) mentioned the name *Rana limnocharis* as a label name credited to "Boie" that they had seen in the Leiden Museum. WIEGMANN (1834: 255-258, 1835: 277-278) compared his new species *Rana vittigera* and *Rana gracilis* to "*Rana limnocharis* H. Boie" or "*Rana limnocharis* Boie", a name for which he did not provide a reference. Then this name was forgotten for over 20 years, and the name *Rana gracilis* Wiegmann, 1834 was used for the species it denotes, until the name *Rana limnocharis* was resurrected by PETERS (1863: 77-78; 1871: 647), who cited WIEGMANN's (1834) text, credited the name to "Boie in Leyd[en] Museum", and stated that it should replace the name *Rana gracilis*. This was followed by STOLICZKA (1872: 102; 1873: 112), who however introduced the incorrect subsequent spelling *Rana lymnocharis* and credited it to "Boie", still without a reference.

(3) After having used the name *Rana gracilis* (BOULENGER, 1882: 28), BOULENGER (1890: 450) resurrected the original spelling *Rana limnocharis* and credited authorship of this name to WIEGMANN (1834). This interpretation was followed, among others, by STEINER (1907: 127, 1910: 95), BARBOUR (1912: 64), BOULENGER (1912: 236), SMITH (1916: 165), ANNANDALE (1917: 132), KIRTISINGHI (1957: 38), NAKAMURA & UENO (1963: 49) and GORHAM (1974: 146).

(4) BOULENGER (1920a: 28) presented a slightly different interpretation, since he credited the species's name to Boie in WIEGMANN (1834). This was accepted by many authors, including VAN KAMPEN (1923: 167), LIU (1950: 315), INGER (1954: 267-268, 1966: 205), LIU & HU (1961: 139), BERRY (1975: 73), ANONYMOUS (1977: 81), FROST (1985: 500), MAEDA & MATSUI (1989: 108), FEI et al. (1991: 302), YANG (1991: 131), YI et al. (1993: 249), ZHAO & ADLER (1993: 144) and DUTTA & MANAMENDRA-ARACHCHI (1996: 91).

(5) STEINER (1925: 27) was the first to point out that the name *Rana limnocharis* had first been published by GRAVENHORST (1829), and that the latter had credited this name to Kuhl. In the synonymy of this species, he therefore wrote its full original name as follows "*Rana limnocharis* Kuhl Gravenhorst". This writing was also used by FANG & CHANG (1931: 111).

(6) However, many subsequent authors only mentioned GRAVENHORST (1829) as author of the name, without mentioning Kuhl's "original authorship". This was the case, among others, of GU & BORING (1929: 30), POPL (1931: 491), BORING et al. (1932: 35), CHANG & HSU (1932: 174), BORING (1934: 20, 1945: 82), POPL & BORING (1940: 50), BOULRIET (1942: 249), TAYLOR & ELBLE (1958: 1051), TAYLOR (1962: 380), OKADA (1966: 112), DUBOIS (1984b: 143, 1992: 315), CHOI & LIN (1997: 27), DUTTA (1997: 133), MANIHEY & GROSSMANN (1997: 97) and FEI (1999: 182).

(7) Finally, DUBOIS (1974: 382-383, 1981: 238) cited this name as "*Rana limnocharis* Boie in GRAVENHORST, 1829".

Despite this great diversity of interpretations, few discussions were clearly devoted to the correct authorship of the name.

INGER (1954: 267-268) stated that the first "adequate description" of *Rana limnocharis* was to be found in WIEGMANN's (1834) text, where the name was credited to Heinrich Boie. INGER (1954) reported having seen a copy of the unpublished manuscript of Boie's original description of *Rana limnocharis*, and he concluded that the name *Rana limnocharis* should be credited to Boie in WIEGMANN (1834).

DUBOIS (1974: 382-383) noted that the first published mention of the name *Rana limnocharis* was in GRAVENHORST (1829), but that this latter author, although not very explicitly, credited it to Boie: he therefore suggested to cite this name as "*Rana limnocharis* Boie in GRAVENHORST, 1829". Subsequently however (DUBOIS, 1984b), he realized that GRAVENHORST (1829) was responsible both for first publication of the name and for satisfying the criteria of its availability, and was therefore its sole author, in the technical nomenclatural sense of this term. However, he did not provide a detailed explanation of these reasons to reject INGER's (1954) interpretation.

ZHAO & ADLER (1993: 144) concurred with INGER (1954), and provided several reasons for refusing to credit GRAVENHORST (1829) with the authorship of the valid name of this species: "The name was introduced in Gravenhorst's synonymy of *R. cancrivora*, not as a proper species name, but as a description of frogs living in small pools (hence his use of the word '*Ranae*' rather than *Rana*). Furthermore, we regard Gravenhorst's short description as unidentifiable. Boie's name, accompanied by a full description and a figure, is the first clear association of the name *R. limnocharis* with this taxon". In their synonymy of *Rana limnocharis*, these authors listed two distinct nominal species, each one with its own author and date: first "*Ranae limnocharis* Gravenhorst, 1829" and second "*Rana limnocharis* Boie in WIEGMANN, 1834". According to these authors, only the first of these two nominal species has a clear type locality (Java), while for the second one they wrote, "Type locality none given". Finally, they stated that the first name was a "nomen dubium" and they wrote the valid name of this species as follows, "*Rana limnocharis* Boie, 1834".

These discussions may appear exaggeratedly quibbling, if not gratuitous, but they are not: according to the interpretation chosen, the nominal species *Rana limnocharis* may have four different authors and two different dates, and more importantly, it may be based on four different name-bearing types. If Kuhl is retained as author of the name, the type-specimens of the nominal species will be the specimens collected by Kuhl & Van Hasselt, and distributed later in several museums, if Boie is the author, only those specimens kept in Leiden when he prepared his description and figure will be types, if Gravenhorst is the author, the name-bearing type will be the specimens examined by this author in Breslau, finally, if Wiegmann is the author, it will be the specimens examined by this author in Berlin. According to the interpretation chosen, different specimens will have to be considered types, and in some cases all types will be lost, this will have consequences regarding the possible choice of a lectotype or neotype for the nominal species *Rana limnocharis* and the allocation of this name to one of the two biological species occurring in Java. A detailed analysis of the history of the case and of the various problems pointed out above regarding the availability of names is therefore in order before any such designation of lectotype or neotype. To avoid criticism, this discussion must be made strictly within the frame of the current *International Code of Zoological Nomenclature* (ANONYMOUS 1999, cited below as 'the Code'), which means that some technical nomenclatural terms and rules will have to be mentioned below.

NOMENCLATURAL STATUS AND AUTHORSHIP OF THE NAME *RANA LIMNOCHARIS*HISTORICAL SURVEY OF THE DISCOVERY, COLLECTING AND NAMING OF *RANA LIMNOCHARIS*

The first documented discovery and collection of *Rana limnocharis* was by H. Kuhl & J. C. Van Hasselt, during their brief stay in Java (respectively 1820-1821 and 1821-1823) which ended with the death of both of them (see e.g. : BRONGERSMA, 1942; ADLFR, 1933). These two naturalists collected several specimens of a small species of frogs common around paddy fields, for which they apparently coined the name *Rana limnocharis*. However, unlike for other amphibian species (see e.g. DUBOIS, 1982), this name was not mentioned in the copies of the letters sent by them to Europe that were published in three different zoological journals (KUHLE & VAN HASSELT, 1822a-b, VAN HASSELT, 1823; KUHLE, 1824a-b). They sent specimens of this species to the Rijksmuseum van Natuurlijke Historie (now the Nationaal Natuurhistorisch Museum) in Leiden, where these were apparently labelled under two different names, "*Rana cancrivora*" for the large ones and "*Rana limnocharis*" for the small ones. Apparently, in this collection the second of these names was credited to Kuhl, as is implied by the mention of "*Ranae limnocharis Kuhl*" in GRAVENHORST (1829: 42), while the name *Rana cancrivora* seems to have been coined by Heinrich Boie, in the manuscript of his *Erpétologie de Java*: this latter book, announced by SCHLEGEL (1826, 1827) and GRAVENHORST (1829), was never published, although it had been sent to the printer in 1830 (see BRONGERSMA, 1942). The fact that specimens labelled under the two above names were kept in the Leiden Museum was reported by WAGLER (1830: 203) and TSCHUDI (1838: 39, 79). Furthermore, according to SCHLEGEL (1827: 282) and DUMÉRIE & BIBRON (1841: 379), some other specimens of this group collected by Kuhl & Van Hasselt were also sent to other European Museums: this is precisely documented at least in two cases, for two specimens in the Breslau (now Wrocław) Museum mentioned by GRAVENHORST (1829: 41-42) and for two specimens in the Berlin Museum mentioned by WIEGMANN (1834: 57-58).

The first publication of the name *Rana limnocharis* was by GRAVENHORST (1829: 42). This name was only briefly mentioned in the chapter dealing with a species described as new under the name *Rana cancrivora*, where, after a Latin diagnosis of the latter species, one can read "Hujus speciei Javanensis de Haan duo individua mecum communicavit, unum, idque majus, capite vix paulo obtusiore, corporis totius facie infera fusco- et fusco-ferrugineo-maculata, sub nomine *Ranae cancrivora*, minus, idque facie infera corporis alba immaculata, sub nomine *Ranae limnocharis* Kuhl. Conferantur quae ad *Hylam leucomystacem*, n. 4, monui." (GRAVENHORST, 1829: 41-42). Above in the same volume, the following appears under *Hyla leucomystax*: "Cum de Haan, conservator humanissimus musei Lugdunensis, hanc *Hylam leucomystacem* Kuhl. javanensem, pluresque alias species, Javae indigenas, ad me transmitteret, simul me certiore faciebat, Boieam descriptiones et icones reptilium novorum Javanensium, in peculiari *Erpétologia*, editurum esse. Inde harum specierum solas diagnoses circumscriptas proferam, ne auctori *Erpétologiae* temere antevertam. Utinam opus exoptatissimum mox in lucem proderat! Conferas conspectum hujus *Erpétologiae*, quem Schlegel in *Bulletin des Sci. nat.* 1826, n. 10, pag. 233-240 edidit." (GRAVENHORST, 1829: 26).

These statements can be summarized as follows: (1) de Haan, Curator at the Leiden Museum, had sent specimens, including several of the new frog species collected in Java by Kuhl & Van Hasselt, to the Breslau Museum; (2) while doing so, he had informed Gravenhorst in Breslau that, in a book already written but not yet published (and summarized by SCHLEGEL, 1826), Boie had provided descriptions and figures of several new herpetological species from Java; (3) in the expectation of the publication of this book, Gravenhorst decided to publish only short diagnoses of the new Javanese species he had received from de Haan, (4) among those were two frog specimens, a large one under the name *Rana cancrivora* and a smaller one under the name *Rana limnocharis*; (5) Gravenhorst's opinion was that these two specimens, which also differed by the shape of the snout and the colour of the lower parts of the body, belonged to a single species, for which he chose the name *Rana cancrivora* and provided a Latin diagnosis.

As mentioned above, ZHAO & ADLER (1993) considered the status of the name *Rana limnocharis* in GRAVENHORST (1829) as questionable, and decided not to apply this name to the species. Let us consider their arguments.

AN ANALYSIS OF ZHAO & ADLER'S (1993) STATEMENTS

Several distinct reasons for not recognizing GRAVENHORST (1829) as the author of the name *Rana limnocharis* can be sorted from ZHAO & ADLER'S (1993) short statements (see above). Let us distinguish them and clearly formulate them in precise technical nomenclatural terms.

(1) ZHAO & ADLER (1993) first stated that the name *Rana limnocharis* "was introduced in Gravenhorst's synonymy of *R. cancrivora*". Although they did not discuss this point further, this statement can be understood as meaning that the name *Rana limnocharis* was not made nomenclaturally available in GRAVENHORST'S (1829) work for the mere reason that it had been introduced there as a synonym.

(2) The next statement of ZHAO & ADLER (1993) is that the name *Rana limnocharis* was proposed "not as a proper species name, but as a description of frogs living in small pools". Strictly taken, this statement does not mean much, since, of course, a new species name can well be proposed for frogs living in small pools. What ZHAO & ADLER (1993) apparently meant was that the two words *Rana limnocharis* were not proposed as the name of a new species-group taxon, but merely as a statement aiming at giving some biological characterisation of a frog species, which otherwise was remaining unnamed. In nomenclatural terms, this means that in GRAVENHORST (1829) the combination *Rana limnocharis* was a kind of "formula" without nomenclatural status, i.e. that the name *Rana limnocharis* was nomenclaturally *unavailable* in this text.

(3) In support of this interpretation, ZHAO & ADLER (1993) claimed that the use of the word "*Ranae*" instead of *Rana* shows that GRAVENHORST (1829) was referring to "frogs" rather than to a frog species. In other words, and to put this in grammatical and nomenclatural terms, they apparently believed that "*Ranae limnocharis*" was a nominative plural, and therefore, for this mere reason, nomenclaturally *unavailable* under the Code for the name of a new species-group taxon. Although they did not state this in full words, it seems that what

ZHAO & ADLER (1993) had in mind is the fact that Article 11.9.1.1 of the *Code* requires that, to be available, a new species-group name should be in the nominative singular

(4) Statements (1) to (3) tend to show that ZHAO & ADLER (1993) regarded the name *Rana limnocharis* as nomenclaturally *unavailable*. However, in their next sentence, as well as in the synonymy of the species, they adopted another interpretation, since they insisted on the fact that the short description of *Rana limnocharis* in GRAVENHORST (1829) was "unidentifiable" and that this name was therefore a "nomen dubium". This interpretation is quite different from, and actually contradictory to the previous one, according to the *Code* (ANONYMOUS, 1999: 111), a "nomen dubium" is a "name of unknown or doubtful application", i.e. a name nomenclaturally *available* but whose *allocation* to a biological taxon is impossible or doubtful. For this reason, Recommendation 75.E of the 1985 edition of the *Code* (ANONYMOUS, 1985: 163) aptly suggested to designate neotypes for species-group nominal taxa "to clarify the application of names when their continued existence as nomina dubia threatens the stability of other names", a formulation that has unfortunately disappeared in the last edition of the *Code*.

To sum up, statements (1) to (3) of ZHAO & ADLER (1993) support the idea that the name *Rana limnocharis* is nomenclaturally *unavailable* in GRAVENHORST's (1829) text, while their statement (4), as well as their inclusion of this name in their synonymy of the species, supports the opinion that this name is nomenclaturally *available* but of *doubtful allocation* to a biological species, and therefore cannot be used. An important weakness of this interpretation is its failure to address the following problem: if two distinct nominal species are to be recognized, the second name is a junior primary homonym of the first one and therefore an invalid name. In other words, if, as clearly implied by the end of their text, the name "*Rana limnocharis* Gravenhorst, 1829" was both (1) an available name and (2) inappropriate for the species, being a "nomen dubium", then the species would have to bear another name as the only other synonym, beside "*Rana limnocharis* Boie, 1834", listed by ZHAO & ADLER (1993), is *Rana gracilis* Wiegmann, 1834, which is also a primary homonym in the genus *Rana* (see e.g. DUBOIS, 1984b: 154), no name would be available for the species and a new name would have to be coined for it!

IS THE NAME *RANA LIMNOCHARIS* IN GRAVENHORST (1829) AVAILABLE UNDER THE *Code*?

Let us first consider the statements (1) to (3) of ZHAO & ADLER (1993). According to these statements, the name *Rana limnocharis* would be nomenclaturally *unavailable* in GRAVENHORST's (1829) text for three distinct but complementary reasons: (1) this name was published there as a synonym; (2) this name would not have been proposed to designate a frog taxon, but merely to refer "informally" to a "kind" of frogs without "naming" them; (3) this name would appear in GRAVENHORST's text as a nominative plural, not as a nominative singular as required by Article 11 of the *Code*.

(1) As correctly stated by ZHAO & ADLER (1993), the name *Rana limnocharis* was first published by GRAVENHORST (1829) as a junior synonym of the name *Rana cancrivora*. What are the nomenclatural consequences of this fact? The *Code* is quite clear about the nomenclatural status of names first published as synonyms. Article 11.6 reads as follows: "A name [...] first published [...] as a junior synonym [...] is not thereby made available" unless it has been "treated before 1961 as an available name and either adopted as the name of a

taxon or treated as a senior homonym", such a name "dates from its first publication as a synonym". The name *Rana limnocharis* mentioned in GRAVENHORST (1829) clearly corresponds to this situation, since it has regularly been treated as an available name since STEJNLER (1925): it therefore dates from its first publication as a junior synonym of *Rana cancrivora*.

(2) Close examination of the whole book of GRAVENHORST (1829) also allows to unambiguously reject interpretation (2). The name "*Ranae limnocharis*" is composed of two words, a generic name bearing a capital and a specific name starting with a lower-case letter, as are all other scientific names of species in the book. This name is printed with wide spaces between letters, which would correspond to italics in modern printing: in GRAVENHORST's book, such a way of printing is used only for scientific names of taxa and for some other words that the author wanted to stress as particularly important in his text. Finally, this name is followed by the mention "Kuhli", i.e. a genitive meaning "of Kuhl", clearly indicating that in GRAVENHORST's mind Kuhl was the author of this name. The name "*Ranae limnocharis*" was thus clearly intended to designate a taxon. Nothing in this text gives the slightest support to the interpretation that this name would be a "formula" informally designating a "kind" of frogs.

(3) ZHAO & ADLER (1993) are also incorrect when they consider the name "*Ranae limnocharis*" to be a nominative plural meaning "frogs living in small pools". As was underlined by BOUR & DU BOIS (1984), the *Code*'s requirement that species-group names, to be nomenclaturally available, be published in the nominative singular, makes sense only when the whole text is written in a language other than Latin: in a Latin text, the grammatical case of words is determined by their place in the sentence, and only names occupying the place of subjects can be written in the nominative, in all other situations, the grammatical case of names will have to be different. We are here exactly in this situation: actually, considering the structure of GRAVENHORST's Latin sentence (quoted above), it is clear that the name "*Ranae limnocharis*" was in the genitive singular and meant "of *Rana limnocharis*". All the text of GRAVENHORST (1829) being written in Latin, in the sentence as it was written the use of the genitive singular was compulsory. This case corresponds to the situation described in Article 11 of the *Code*, "A genus-group name proposed in Latin text but written otherwise than in the nominative singular because of the requirements of Latin grammar is available, provided that it meets the other requirements of availability, but it is to be corrected to the nominative singular" (Article 11.8.1), "An adjectival species group name proposed in Latin text but written otherwise than in the nominative singular because of the requirements of Latin grammar is available provided that it meets the other requirements of availability, but it is to be corrected to the nominative singular if necessary" (Article 11.9.2).

Reasons (1) to (3) given by ZHAO & ADLER (1993) to refuse nomenclatural availability of the name *Rana limnocharis* in GRAVENHORST (1829) are therefore to be rejected. Could there be other reasons to refuse this availability? In other words, does this name meet the "other requirements of availability" mentioned in the *Code*? The answer to this question is clearly "yes": all criteria mentioned in Articles 10, 11 and 12 of the *Code* are met with.

In conclusion of this section, the name *Rana limnocharis* as published in GRAVENHORST's (1829) text is clearly available in zoological nomenclature. Let us now see to which taxon this name applies.

IS THE NAME *RANA LIMNOCHARIS* IN GRAVENHORST (1829) A "NOMEN DUBIUM"?

To be sure, the "description or definition" (in the sense of Article 12 of the *Code*) given to diagnose *Rana limnocharis* in GRAVENHORST (1829) is very short and vague, and liable to cause problems for the allocation of this name to a biological taxon, although it does not pose a problem regarding the nomenclatural availability of the name. DUBOIS & OHLER (1995, 1997a-b) discussed the problems posed by old names based on incomplete or insufficient descriptions. They remarked that the nomenclatural allocation of a name to a taxon does not rely on its description, definition or diagnosis, but on its type-specimens, either actual or potential, and through these specimens to the type-population from which these had been collected. Actually, in frogs, many taxa named in the 18th and early 19th century were first provided with very short and fully insufficient diagnoses or descriptions, and the types have often been lost, but this has no bearing on the availability of names: in most of these cases, the status of these names was later fixed through redescriptions by the same or other authors, re-examination of holotypes or syntypes, or designation of neotypes. As short as it is, the statement that *Rana limnocharis* is smaller than *Rana cancrivora* and has a different snout shape and belly coloration is enough to make the former name nomenclaturally available, even if it is not enough to ascertain the taxonomic allocation of this name to a biological species. To solve the problem of the allocation of the name *Rana limnocharis* to a frog taxon, it is necessary to identify the name-bearing type of this taxon. As mentioned above, the status of this/these type-specimen(s) is directly linked to the authorship of this name. Before addressing this question however, let us consider more generally the rules governing authorship in zoological nomenclature according to the current *Code*.

AUTHORSHIP OF NAMES "BORROWED" FROM MANUSCRIPTS OR COLLECTION LABELS

Article 50.1 of the *Code* provides the following definition of "author" in zoological nomenclature "The author of a name [.] is the person who first publishes it [.] in a way that satisfies the criteria of availability [.]. However, if it is clear from the contents [of the publication] that some person other than an author of the work is alone responsible both for the name [.] and for satisfying the criteria for availability other than actual publication, then that other person is the author of the name [.]". Particularly important, and often overlooked by taxonomists, are the terms "alone responsible". These statements mean that the author of a scientific name according to the *Code* is not any of the following: (1) the person(s) who actually coined the name, or the person(s) who wrote the first unpublished description or definition of the taxon, or provided any other information that could be an indication making the name available under the *Code*, unless in the first valid publication of the name it was made quite clear, in full words, that both the name and the published description, definition or indication were directly copied, without any modification (i.e., "verbatim"), from this unpublished document, (2) any person who could have used this name in conversations, meeting or unpublished documents, such as letters or labels attached to specimens in zoological collections.

According to such stringent rules, the case is much rarer indeed than is often believed by many zoologists where a situation qualifies for authorship of a name being validly stated to be

Java. Whatever the case may be, this is of purely historical but of no nomenclatural importance. The name *Rana limnocharis* having been published in GRAVENHORST (1829) as a junior synonym and a posteriori validated by STEJNEGER (1925) and other subsequent authors, according to Article 50.7 the author of this name is clearly GRAVENHORST (1829), irrespective of who had coined it before its first publication.

THE STATUS OF THE NAME *RANA LIMNOCHARIS* BETWEEN 1829 AND 1863

After the book of GRAVENHORST (1829), the first published occurrence of the name *Rana limnocharis* was in WAGLER (1830: 230), who listed this species as valid among the species of the genus *Rana*. WAGLER (1830) did not refer however to GRAVENHORST's (1829) text, but to an unpublished label by Boie in the Leiden Museum, and he provided no description, diagnosis or indication characterising the species. It cannot therefore be argued that WAGLER (1830) referred to the name *Rana limnocharis* Gravenhorst, 1829, and the name *Rana limnocharis* in his text must be considered a nomen nudum, without status in nomenclature.

The situation is different in WIEGMANN's (1834) book, the second published text providing descriptive data on *Rana limnocharis*. WIEGMANN described two new species, *Rana vittigera* and *Rana gracilis*, both of which he compared with "*Rana limnocharis* Boie". He stated that the Berlin collection possessed two specimens of the latter species; most probably, although this is not stated in this text, these specimens were also part of those collected by Kuhl & Van Hasselt in Java and had been obtained from the Leiden Museum. Later in the same text, WIEGMANN (1834: 260) stated that he had received the new species "*Hyla quadrilineata* H. Boie in *Mus. Lugd.*" from Wagler (who was in Munchen), thus clearly indicating the presence in the Berlin collection of specimens from Boie's material.

What is the status of the name *Rana limnocharis* in WIEGMANN (1834)? Although he credited the name to Boie, WIEGMANN (1834) did not cite the manuscript of the *Erpétologie de Java*, nor GRAVENHORST's (1829) book. The absence of any reference to the latter work in the whole text precludes considering WIEGMANN (1834) as having used the name *Rana limnocharis* Gravenhorst, 1829. Rather, this author used an unpublished label or manuscript name, which he made nomenclaturally available, independently from GRAVENHORST (1829), by publishing rather detailed descriptive data on this species. Therefore, WIEGMANN (1834) created a new, distinct, nominal species. Who is the author, in nomenclatural terms, of this name? The situation here is different from that discussed above for *Rana limnocharis* Gravenhorst, 1829, since in WIEGMANN's case the new name was not published as a junior synonym but as a valid name, credited to Boie. In this case, Article 50.1 of the *Code* applies, and despite WIEGMANN's himself crediting this name to Boie, there is no doubt that the author is WIEGMANN (1834), who described several precise morphological features of the species, clearly drawn from personal examination of the two specimens in his hands.

WIEGMANN (1835: 277-278) summarized his 1834 work and mentioned again the name *Rana limnocharis*. This name then appeared twice as a junior synonym in TSCUDI (1838: 79) and in DUMÉRIE & BIBRON (1841: 376, 379), who referred to unpublished manuscripts or labels, and was then apparently ignored by all authors until PETERS (1863) resurrected it and

cited WIEGMANN's (1834) text. From 1863 this name was no longer used as a *nomen nudum*, but as a name considered validly published in WIEGMANN (1834), or, after STEJNEGER (1925), in GRAVENHORST (1829).

STATUS OF THE ORIGINAL NAME-BEARING TYPES

As mentioned above, identification of the proper author, in the precise nomenclatural sense of the term, of a scientific name, is crucial, as it implies identification of the proper name-bearing type of the nominal taxon, which ultimately allows proper allocation of the name to a biological taxon.

The analysis above has shown that two distinct nominal species bearing the name *Rana limnocharis*, with different authors and dates, should be recognized: it results that both nominal species have their own name-bearing type, which must be identified.

THE ORIGINAL NAME-BEARING TYPE OF *RANA LIMNOCHARIS* GRAVENHORST, 1829

The name *Rana limnocharis* Gravenhorst, 1829 was first published as a junior synonym and therefore falls under the provisions of Article 72.4.3 of the Code: "The type series of a nominal species-group taxon of which the name was first published as a junior synonym, but was made available before 1961 under the provisions of Article 11.6, consists of the specimen (or specimens) cited with that name in the published synonymy, or, if none was cited there, denoted by that name when it was adopted as the name of a taxon".

The situation in GRAVENHORST (1829) is particularly clear, as this author stated in full words that he had received from de Haan a single specimen labelled *Rana limnocharis*. This specimen was therefore the holotype by monotypy of *Rana limnocharis* Gravenhorst, 1829. This specimen was kept in the Breslau (now Wrocław) Museum, and apparently no information about it was published posterior to GRAVENHORST's (1829) book. In reply to a request of 23 May 1997, on 6 June 1997 Prof. Andrzej Wiktor (Muzeum Przyrodnicze, Uniwersytet Wrocławski) informed one of us (AD) by letter that the only remaining specimens of the Gravenhorst collection are some insects, and that attempts to find specimens of other groups before the Second World War were unsuccessful.

The holotype of *Rana limnocharis* Gravenhorst, 1829, collected in Java by Kuhl and Van Hasselt between 1820 and 1823, must therefore be considered lost, and definitive stabilization of the status of this name will require the designation of a neotype.

THE ORIGINAL NAME-BEARING TYPE OF *RANA LIMNOCHARIS* WIEGMANN, 1834

According to the analysis presented above, the name *Rana limnocharis* Wiegmann, 1834 was based on descriptive information published by WIEGMANN (1834) after examination of two specimens of "*Rana limnocharis* Boie" in the Berlin Museum, presumably collected by Kuhl and Van Hasselt in Java and received from the Leiden Museum. These two specimens

were therefore the original syntypes of this nominal species. These two specimens are apparently lost: according to Rainer Gunther (e-mail to AMO of 30 November 1998), the Berlin Museum collection does not have a single specimen of *Rana limncharis* collected by Kuhl or Kuhl and Van Hasselt in Java. Final stabilization of the status of this name also requires the designation of a neotype.

SPECIMENS AVAILABLE FOR NEOTYPE DESIGNATIONS

In order to definitely avoid possibilities of nomenclatural confusion, and to know which of the two "sibling" species in Java should bear the name *Rana limncharis* Gravenhorst, 1829 (see VETTH et al., 2000), designation of a neotype for this nominal species is necessary. As for the name *Rana limncharis* Wiegmann, 1834, being a junior primary homonym it is an invalid name and its existence does not threaten the stability of nomenclature, but, in order to know in which synonymy it will have to stand, a neotype designation is also necessary. The most logical action is to place it in the synonymy of *Rana limncharis* Gravenhorst, 1829. Since neotypes have to be designated for both nominal species, the most parsimonious solution is to choose the same specimen as neotype of both: these two names will then be linked by an objective synonymy and no further discussion of their status should arise in the future.

Which specimen would be best suited for this neotype designation? Both nominal species were created on the basis of specimens collected in Java by Kuhl and/or Van Hasselt and sent to the Breslau and Berlin Museums from the Leiden Museum. These specimens being lost, it seems appropriate to look for other specimens collected in Java by these naturalists and kept in the Leiden Museum or in other museums under the name *Rana limncharis*, or possibly also of *Rana cancellata* (as both species were considered synonyms by some ancient authors, including GRAVENHORST, 1829). Both SCHLEGEL (1827) and DUMERIL & BIBRON (1841) stated that such specimens had been sent to several other European museums, but unfortunately these authors did not specify which ones. Published and unpublished information was therefore gathered about this question, with the following results. (1) no specimens under these two specific names and collected in Java by Kuhl and/or Van Hasselt are to be found in the old collections of the museums of Basel (MÜLLER, 1878, 1880, 1882, 1883, 1885, 1887, 1889, 1892, 1901), Frankfurt am Main (BOETTGER, 1892, MERTENS, 1967, AD & AMO, personal observations), London (Nick Arnold, e-mail to AMO of 27 March 1998), München (Frank Glaw, e-mail to AD of 31 March 1998), Paris (AD & AMO, personal observations) and Wien (Heinz Grillitsch, e-mail to AD of 24 March 1998). (2) the Leiden Museum still has a single specimen of this group, RMNH 4287 (Marinus S. Hoogmoed, e-mail to AD of 16 March 1998). This latter specimen, kept under the name *Rana limncharis*, is stated to have been collected by Kuhl in Java (no information is available on locality and date of collection). It is a young female in rather good condition, and this specimen, described below, is fully appropriate for neotype designation, although unfortunately it has no precise locality. Given the information provided in the letters sent by Kuhl and Van Hasselt from Java, it seems likely that this specimen was collected in the vicinity of Buitenzorg, now Bogor. "En nog zijn wij geen 20 uren ver van Buitenzorg gekomen" ("And until now we did not go further than 20 hours from Buitenzorg") (KUHLE & VAN HASSELT, 1822a: 103).

STATUS OF A FEW NAMES CLOSELY RELATED TO THE NAME *RANA LIMNOCHARIS*

As mentioned above, for a long time the name *Rana limnocharis* was applied indiscriminately to small frogs from a wide area of south and south-eastern Asia. As a number of different names had been proposed in the beginning of zoology for frogs of this complex, these names were long considered either to be synonyms of *Rana limnocharis* or, at best, to apply to subspecies of the latter species. During the second half of our century, in this group and many others (see DUBOIS & OHLER, 1998), the strong "lumper philosophy" of INGER (1954, 1966) had a drastic influence on the taxonomy adopted by most authors: thus, INGER (1954: 267-274, 1966: 205-206) treated the taxon *Rana vittigera* Wiegmann, 1834 from the Philippines as a subspecies of *Rana limnocharis*, as for the name *Rana wasi* Annandale, 1917, although this name clearly applied to frogs of this complex and was based on a type-specimen from Borneo, he ignored it altogether in his book on Bornean frogs (INGER, 1966). DUBOIS (1975b, 1984b, 1987, 1992) showed that this complex was in fact composed of a number of distinct species, and gave a list of names available for these frogs. He suggested that several names until then considered as synonyms or as subspecific names did apply to some of these species, and that other species remained to be named. We will provide elsewhere (DUBOIS & OHLER, in preparation) an updated review of the taxonomy of this group. Here we will only extend the discussion to the names which may still pose nomenclatural problems in relation with the existence of two distinct species of this complex in Java.

Following DUBOIS's (1984b) paper, few names remained as genuine synonyms of *Rana limnocharis*. However, ZHAO & ADLER (1993: 144) still regarded the name *Rana gracilis* Wiegmann, 1834 as a synonym of the latter. This synonymy deserves discussion. Besides, we discuss here the status of four additional names. *Rana cancrivora* Gravenhorst, 1829; *Rana vittigera* Wiegmann, 1834, *Rana multistriata* Hallowell, 1861, and *Rana wasi* Annandale, 1917.

THE STATUS OF THE NAME *RANA CANCRIVORA* GRAVENHORST, 1829

In contrast with most of other names concerning frogs of this complex, the name *Rana cancrivora* has long been considered to apply to a species distinct from *Rana limnocharis*, e.g. by BOULANGER (1920a: 23), VAN KAMPEN (1923: 170), SMITH (1927: 205; 1930: 96), BOLLEET (1942: 245), TAYLOR (1962: 377), ZHAO & ADLER (1993: 140), or even INGER (1954: 260; 1966: 175), who provided comparisons between *Rana cancrivora* and *Rana "limnocharis" vittigera*. The fact that *R. cancrivora* was almost universally considered distinct from *R. limnocharis* rests apparently only on the comparative diagnosis provided by GRAVENHORST (1829) for these two species, where this author stated that the former was "larger" than the latter: since then, the name *Rana cancrivora* has been consistently applied to a large species of this complex, occurring in Java and neighbouring regions. However this action has never been based on the examination of a type specimen, and apparently until now no author has tried to trace such a specimen.

An incidental result of the above work is the verification that all type-specimens of species described as new by GRAVENHORST (1829), including *Rana cancrivora*, must now be

considered lost. GRAVENHORST (1829) himself considered the names *Rana imnocharis* and *Rana cancrivora* as synonyms, so that unequivocal allocation of the name *Rana cancrivora* to a biological species also requires designation of a neotype. None of the collections mentioned above is known to harbour any specimen under the name *Rana cancrivora* collected near Buitenzorg in Java by Kuhl and/or Van Hasselt. Consequently, another specimen is described below as neotype. For this, we chose a specimen in good condition, collected recently in a precise locality near Bogor and that belongs to the species traditionally recognised under this name. This specimen is part of those that were used as outgroup in the molecular study of this group reported by VEITH et al. (2000). Designation of this specimen as neotype of *Rana cancrivora* Gravenhorst, 1829 will preclude any confusion in the allocation of this name to a biological species.

THE STATUS OF THE NAME *RANA VITTIGERA* WIEGMANN, 1834

WIEGMANN (1834: 255-257, pl. 21 fig. 1) described *Rana vittigera*, provided a good drawing of a specimen, and compared this new species to *Rana imnocharis*. Subsequently, the species *Rana vittigera* was considered as a synonym of *Rana tigrina* Daudin, 1802 by some authors (e.g. STEJNEGLER, 1907: 139) and of *Rana cancrivora* Gravenhorst, 1829 by others (e.g., BOLLENGER, 1920a: 23), until TAYLOR (1920: 236) resurrected this name for a species of the Philippines. He was followed by SMITH (1927: 205-207) and INGER (1954: 267), who however reduced this taxon to the rank of a subspecies of *Rana imnocharis*. None of these authors examined the type-specimens of this taxon. INGER (1954: 267) stated that its type-locality was "Laguna de Bay, Luzon", which was incorrect because, as noted by TAYLOR (1920: 236), the species had been described on the basis of specimens from two different origins.

As a matter of fact, according to WIEGMANN (1834: 257), the original description was based on several specimens, some from Laguna de Bay (Luzon, Philippines), and some from the market of Macao (now Aomen, Guangdong, China). PETERS (1863: 77) provided more information in this respect: he stated that the Berlin Museum had two specimens (ZMB 3269) from Laguna de Bay and two others (ZMB 3270) from China. DUBOIS (1984b: 151-152) commented on this and restricted the type-locality of the species to Laguna de Bay. His comment was misunderstood by DUFFINMAN (1993: 229), who wrote "Lectotypes: ZMB 3269, designated by Dubois, 1984. Alytes, 3: 152". In fact, DUBOIS (1984b: 152) had not designated a lectotype, but had stated that such a designation *should* be made, *after* examination of the specimens. "In order to stabilize definitely the use of the name *vittigera* as proposed by INGER (1954), it would be necessary to designate formally one of the two specimens ZMB 3269 as lectotype of *Rana vittigera* Wiegmann, 1835, what I cannot do for the time being, as I have not yet been able to examine these specimens." (translated from the French text in DUBOIS, 1984b: 152). Because of this misunderstanding, DUFFINMAN (1993) "almost" designated a lectotype for this species, but of course he did not, because, to be valid, a lectotype designation must point to an individual, and ZMB 3269 consists of two specimens.

On 21 December 1995, thanks to the hospitality of Rainer Gantner, we had the opportunity to examine the 4 known syntypes of this species in the Berlin Museum. When we got the bottles containing these specimens for examination, these bottles were still sealed with resin and had to be cut open with a scalpel, thus emitting a very pleasant smell of old

aromatized alcohol, it is very likely that these specimens had never been examined since the 19th century, perhaps since PETERS's (1863) work.

These four specimens are in good condition. The two specimens from Laguna de Bay, ZMB 3269, are two adult females (SVL 68.6 mm and 57.2 mm). The two specimens from Macao, ZMB 3270, are also two adult females (SVL 58.5 mm and 55.9 mm). Comparisons of these four specimens with fig. 1 of pl. 1 of WIEGMANN (1834) shows that the latter was drawn from the largest of the two specimens from Laguna de Bay. This specimen is therefore here designated as lectotype of *Rana vittigera*, which is consistent with the use of this name introduced by TAYLOR (1920) and adopted by all subsequent authors. This lectotype is described in detail and figured below.

THE STATUS OF THE NAME *RANA GRACILIS* WIEGMANN, 1834

WIEGMANN (1834: 257-258) described *Rana gracilis* on the basis of a single adult male specimen, collected in China near the "Cap Syng-more" (now Kap Shui Mun, Lantau Island, Hong Kong, China). He considered this species as very close to *Rana limncharis*. PETERS (1863: 78) stated that this species was "completely identical" ("stimmt ganz überein") with *Rana limncharis* and *Rana vittigera*. Since then, all authors have considered the name *Rana gracilis* Wiegmann, 1834 as a subjective synonym of *Rana limncharis*, and this synonymy was still considered valid by ZHAO & ADLER (1993: 144), who however did not include *Rana vittigera* in this synonymy.

During our stay in Berlin mentioned above, we examined the holotype of this species, ZMB 3255. We provide below a redescription and a photograph of this specimen. We consider that, by several important characters, this specimen is distinct from both species of this group known from Java. Frogs from China have significantly shorter heads, forelegs and hindlimbs, and their inner metatarsal tubercle is shorter relative to the length of first toe. We will provide more information on this question elsewhere, but, for the purpose of this paper, it is enough to say that this Chinese species is distinct from both Javanese species of this group, and should be removed from the synonymy of *Rana limncharis*. This statement is also supported by the results of the electrophoretic comparison of specimens from Java and Hong Kong (TOIDA et al., 1998).

However, the name *Rana gracilis* Wiegmann, 1834 cannot be resurrected for this Chinese species, because this name is preoccupied in the genus *Rana* (see e.g. DUBOIS, 1984b: 154), being a junior primary homonym of the name *Rana gracilis* Gravenhorst, 1829, a Sri Lankan species of the subgenus *Silviana* Dubois, 1992 of the genus *Rana* Linnaeus, 1758 (see DUBOIS, 1992: 326). According to the Code, a junior primary homonym is permanently invalid, so that the name *Rana gracilis* cannot be resurrected for the Chinese species, even if the two species bearing this name are no longer considered congeneric. As no junior synonym of this name is currently known (see e.g. ZHAO & ADLER, 1993: 144), it would seem that we are in a situation where, to designate this Chinese species, a new replacement name (nomen novum) should be coined for the name *Rana gracilis* Wiegmann, 1834. However, we propose below another, more "parsimonious", solution to this problem.

THE STATUS OF THE NAME *RANA MULTISTRIATA* HALLOWELL, 1861

In a long and famous paper, HALLOWELL (1861) described several amphibian species from Japan and Hong Kong. Several of these nominal species have never been allocated to biological species since then, and their types seem to be lost (see e.g. ZHAO & ADLER, 1993: 280). However, these names are nomenclaturally available and their status should be clarified, which can be done through the designation of neotypes from the same localities (see e.g. DUBOIS & OHLER, 1997a-b). To be sure, HALLOWELL's (1861) descriptions are too vague to allow unambiguous allocation of these names. In order not to threaten the stability of nomenclature, we think allocation of these names should be done following the three following principles: (1) the biological species to which the name is allocated should be known to be present in the area whence HALLOWELL's specimens came; (2) it should not have characters incompatible with HALLOWELL's (1861) description; (3) this species should either be still unnamed or be known under a name published before 1861, so that HALLOWELL's name becomes its junior subjective synonym. In the latter case, HALLOWELL's name would remain available for further taxonomic work, for example if a frog species from Hong Kong, currently considered conspecific with other populations, was later shown to be a different species.

In the light of these ideas, we propose the following interpretations of the three species names proposed by HALLOWELL (1861) for frogs of Hong Kong, and which ZHAO & ADLER (1993: 280) kept unallocated to biological species: *Rana trivittata*, *Rana nebulosa* and *Rana multistriata*.

(1) Concerning the name *Rana trivittata*, in the light of the original description (HALLOWELL, 1861: 504-505), we consider that it could well apply to the species now known as *Rana macrodactyla* (Günther, 1859), a member of the subgenus *Hylarana* Tschudi, 1838 of the genus *Rana* (see DUBOIS, 1992: 328), which occurs in Hong Kong (LAI & NG, 1972; KARSTEN et al., 1986). Definitive stabilization of the status of *Rana trivittata* as a junior subjective synonym of *Rana macrodactyla* will require the designation as neotype of *R. trivittata* of a specimen of the latter species collected in Hong Kong.

(2) As for the name *Rana nebulosa*, examination of the original description (HALLOWELL, 1861: 505) leads us to think that it could fit the species currently known as *Rana livida* (Blyth, 1856), a species currently placed either in the subgenus *Odorrana* Fei, Ye & Huang, 1991 or in the subgenus *Eurana* Dubois, 1992 of the genus *Rana* (see FILLI et al., 1991: 147; DUBOIS, 1992: 328; FILLI, 1999: 188), which also occurs in Hong Kong (LAI & NG, 1972; KARSTEN et al., 1986). In this case also, stabilization of this name in this synonymy will require the designation of a neotype from Hong Kong.

(3) Finally, HALLOWELL's (1861: 504-505) original description of the species *Rana multistriata* could well apply to a species of the *Rana limncharis* group, which is also present in Hong Kong. As we have seen above, the holotype of *Rana gracilis* Wiegmann, 1834, collected in Hong Kong, belongs to a species distinct from *Rana limncharis*, and for which no scientific name is currently available. We propose to take advantage of this situation to apply the name *Rana multistriata* to this unnamed Chinese frog species, through designation as

neotype of the latter of the holotype of *Rana gracilis*, described and figured below: this solution of the nomenclatural problems posed by both these names is an example of "nomenclatural parsimony", a concept that will be discussed at more length elsewhere (DUBOIS, in preparation)

THE STATUS OF THE NAME *RANA WASI* ANNANDALE, 1917

ANNANDALE (1917: 131-132) erected the species *Rana wasi* for specimens from various regions (Sarawak, Myanmar, Assam & Nicobar Islands). He stated that the holotype, ZSI 17282, was from Kuching (Sarawak, Malaysia, in the island of Borneo). BOULENGER (1920a: 28) placed this name in the synonymy of *Rana limnocharis*, where it has remained until now (e.g.: VAN KAMPEN, 1923: 167, BOURRET, 1942: 250, GORHAM, 1974: 146), except for authors who failed to mention it (e.g.: LIU, 1950: 315; TAYLOR, 1962: 380; INGER, 1966: 205). On 14 August 1973, DUBOIS (1984b: 155) was able to examine and measure the holotype of *Rana wasi* in the Calcutta Museum: it is an adult female (SVL 56 mm; TL 31 mm; HW 19 mm; HL 18.5 mm; IUE 3 mm, UEW 4.5 mm; IN 5 mm), which is quite accurately shown in fig. 5 and 5a of pl. 5 of ANNANDALE (1917), here reproduced as fig. 1. We are unable to provide here a full redescription of this holotype, as the current loan policy of the Zoological Survey of India of Calcutta is to refuse to send specimens abroad (Indraneil Das, e-mail to AD of 29 October 1998).

GENERIC CLASSIFICATION

A few words must be said here about the generic classification of the frogs related to *Rana limnocharis*. Although long maintained in the genus *Rana* Linnaeus, 1758 (the type-species of which is the European *Rana temporaria* Linnaeus, 1758, see DUBOIS, 1992: 333), these species have often been referred to a particular "group", "complex", "section" or "subgenus" of this genus. Thus, ANNANDALE (1917: 131) placed them in a "*Rana limnocharis* group", which he considered distinct from a "*Rana tigrina* group". In contrast, BOULENGER (1918: 115) united both groups in a "*groupe de R. tigrina et limnocharis*" of his subgenus *Rana* s. str., he later considered the same group as a "section" "*Ranae tigrinae*" of this genus (BOULENGER, 1920a: 9). DICKERT (1938) placed these species, as well as others, in the genus *Dicroglossus* Gunther, 1860, which was recognized as a valid genus by LAURANT (1950), and later by DUBOIS (1974), but as a subgenus of *Rana*. DUBOIS (1975a: 1112) pointed out that, for the latter group, the name *Euphylyctis* Fitzinger, 1843 had priority. DUBOIS (1981: 238-240) recognized several species groups in the latter subgenus and designated *Rana limnocharis* as type-species of *Fejervarya* Bolkay, 1915, in order to provide a genus-group name for this group. DUBOIS (1984b) proposed to use this latter name as a subgeneric name within *Rana*. DUBOIS (1987: 61) transferred this subgenus to the genus *Limnodynastes* Fitzinger, 1843. Finally, FLEI et al. (1991: 126) were the first to raise the *Rana limnocharis* group to the rank of a distinct genus, for which, however, they used the incorrect name *Euphylyctis* (which applies in fact to *Rana cyanophlyctis* Schneider, 1799 and related species, i.e. a quite distinct group indeed: see DUBOIS, 1992). DUBOIS (2000), ISKANDAR (1998, 1999), FLEI (1999) and MARMAYOU et al. (2000) followed this suggestion, except for its nomenclatural part, since *Fejervarya* is the valid name for this group.



Fig. 1 *Rana wasi* Annandale, 1917, holotype, ZSI 17282 head in dorsal and lateral view (reproduced from fig. 5 and 5a of pl. 5 of ANNANDALE, 1917)

Several reasons lead us to adopt FIT et al.'s (1991) proposal. This decision is supported both by the important phenetic differences that exist between *Fejervarya* and *Limnonectes*, such as the shape of the tips of digits of adults (OHMER & DU BOIS, 1999), their types of male secondary characters (BOUJINGIER, 1970a), a higher morphometrical distance between the adults of these genera than between them and those of other genera such as *Phyllinoglossus* Peters, 1867 (OHMER & DU BOIS, 1999), or the differences in the mouthparts of their tadpoles (FIT et al., 1991). More significantly even, the preliminary cladistic analyses, based on DNA sequencing, provided independently by VINCEIS (1999), MARMAYOL et al. (2000) and BOISSET

& MILINKOVITCH (2000), suggest that *Fejervarya* is not the sister-group of *Lumnionectes*, but is more closely related to other genera such as *Hoplobatrachus* Peters, 1863 and *Sphaerotheca* Gunther, 1859.

For all these reasons, we refer here all the species of the former "*Rana lumnionectes* group" to a distinct genus *Fejervarya* Bolokay, 1915. We take this opportunity to point out the presence in all species of this genus of a unique common derived character which seems to have escaped the attention of all authors until now. This character was observed by us in all examined species of this genus, but not in any other of a vast array of ranids from various groups examined in this respect by us and also by Julio Mario Hoyos (personal communication). In species of the genus *Fejervarya*, the ventro-lateral edge of the *musculus pectoralis pars abdominalis* is slightly attached to the skin from armpit to groin, whereas usually in ranids it is attached to muscles which are dorsal relative to it (*musculus rectus abdominis* and *musculus obliquus externus*). This results in the presence, in adults of both sexes of all species of *Fejervarya*, of a dark ventro-lateral line from armpit to groin, which is usually very clearly conspicuous in live specimens, whose belly in this genus is usually bright white or yellowish and unspotted. This dark line being characteristic of the species of the genus *Fejervarya*, we propose to call it the "*Fejervaryan line*". We consider this character as an autapomorphy of the genus *Fejervarya*, that provides an apogonosis for this genus (see DUBOIS, 1997).

This genus is still in need of an overall revision. For the time being, on the basis of the information already published by DUBOIS (1984b, 1987, 1992) and provided in the present paper, we recognize the following species as valid: *Fejervarya andamanensis* (Stoliczka, 1870); *Fejervarya cancrivora* (Gravenhorst, 1829); *Fejervarya greenii* (Boulenger, 1904); *Fejervarya keralensis* (DUBOIS, 1981) [synonym: *Rana verrucosa* Gunther, 1876]; *Fejervarya kirtisinghei* (Manamendra-Arachchi & Gabadage, 1996); *Fejervarya lumnionectes* (Gravenhorst, 1829) [synonyms: *Rana lumnionectes* Wiegmann, 1834 and *Rana wasi* Annandale, 1917]; *Fejervarya multistriata* (Hallowell, 1861) [synonym: *Rana gracilis* Wiegmann, 1834]; *Fejervarya nepalensis* (DUBOIS, 1975); *Fejervarya nilagirica* (Jerdon, 1853); *Fejervarya pierrei* (DUBOIS, 1975); *Fejervarya rufescens* (Jerdon, 1853); *Fejervarya syhadrensis* (Annandale, 1919); *Fejervarya teraiensis* (DUBOIS, 1984); *Fejervarya vittigeri* (Wiegmann, 1834). Besides, the following names, which are still unsufficiently characterized in published works, will also have to be considered in any global revisionary work of this genus: *Fejervarya altitabris* (Blyth, 1855); *Fejervarya assimilis* (Blyth, 1852); *Fejervarya brama* (Lesson, 1834); *Fejervarya brevipalmata* (Peters, 1871); *Fejervarya frithi* (Theobald, 1868); *Fejervarya moodiei* (Taylor, 1920); *Fejervarya munthi* (Pillai, 1979); *Fejervarya mysorensis* (Rao, 1922); *Fejervarya nicholensis* (Stoliczka, 1870); *Fejervarya parambikulamana* (Rao, 1937); *Fejervarya pulla* (Stoliczka, 1870); *Fejervarya raja* (Smith, 1930); *Fejervarya sauriceps* (Rao, 1937); *Fejervarya schlueteri* (Werner, 1893); *Fejervarya verruculosa* (Roux, 1911).

DESCRIPTIONS OF TYPE-SPECIMENS

NEOTYPE, BY PRESENT DESIGNATION, OF *RANA LIMNOCHARIS* GRAVENHORST, 1829 AND OF *RANA LIMNOCHARIS* WIEGMANN, 1834 (FIG. 2-3)

RMNH 4287, young female, collected by H. Kuhl in 1821 near Buitenzorg [now Bogor] (06°35'S, 106°47'E), West Java, Java, Indonesia

(A) Size and general aspect. - (1) Specimen of medium size (SVL 44.4 mm), body rather slender.

(B) Head (2) Head of medium size, wider (HW 16.0 mm) than long (HL 14.6 mm; MN 13.6 mm, MFE 9.8 mm; MBE 6.2 mm), convex (3) Snout oval, protruding, its length (SL 7.78 mm) longer than horizontal diameter of eye (EL 5.19 mm). (4) Canthus rostralis rounded, loreal region concave, acute (5) Interorbital space flat, smaller (IUE 2.20 mm) than upper eyelid (UEW 3.89 mm) and internarial distance (IN 3.05 mm); distance between front of eyes (IFE 6.3 mm) more than one half of distance between back of eyes (IBE 10.9 mm). (6) Nostrils oval, with small lateral flap, closer to tip of snout (NS 2.46 mm) than to eye (EN 4.02 mm) (7) Pupil rounded. (8) Tympanum (TYD 2.92 mm) distinct, oval, horizontal, about half of eye diameter; tympanum-eye distance (TYE 1.55 mm) about half its diameter (9) Pineal ocellus present, between anterior border of eyes (10) Vomerine ridge present, bearing few small teeth, between choanae, with an angle of 45° to body axis, closer to choanae than from each other, longer than distance between them. (11) Tongue large, cordate, emarginate. (12) Supratympanic fold distinct, from eye to shoulder. (13) Parotoid glands absent. (14) Cephalic ridges absent. (15) Co-ossified skin absent.

(C) Forelimbs. (16) Arm short, rather thin (FLL 8.7 mm), shorter than hand (HAL 9.8 mm), not enlarged (17) Fingers long, thin (TFL 5.77 mm) (18) Relative length of fingers, shortest to longest. II < IV < I < III. (19) Tips of fingers pointed (20) Fingers without dermal fringe, webbing absent (21) Subarticular tubercles prominent, rounded, single, all present. (22) Prepollex oval, prominent, two oval, flat palmar tubercles; supernumerary tubercles absent

(D) Hindlimbs. (23) Shank almost four times longer (TL 23.6 mm) than wide (TW 6.6 mm), longer than thigh (FL 20.6 mm), but shorter than distance from base of internal metatarsal tubercle to tip of toe IV (FOL 24.6 mm) (24) Toes long, thin; toe IV long (FTL 14.4 mm), more than one third of distance from base of tarsus to tip of toe IV (TFOL 36.1 mm) (25) Relative length of toes, shortest to longest. I < II < V - III < IV. (26) Tips of toes pointed (27) Webbing moderate: I 1 - 2 II 1 - 2 III 1 - 2 $\frac{2}{3}$, IV 2 $\frac{2}{3}$, I $\frac{1}{2}$, V (WTF 4.80 mm, WFF 4.54 mm, WI 3.69 mm; WII 3.50 mm, MTTF 12.2 mm, MTFF 12.2 mm; TFTF 11.8 mm, FTF 12.8 mm). (28) Dermal fringe along toe V present, from tip of toe to base of metatarsus, well developed (29) Subarticular tubercles prominent, rounded, simple, all present (30) Inner metatarsal tubercle rather short, prominent, its length (IMT 2.14 mm) more than 2.5 times in length of toe I (ITL 5.57 mm) (31) Inner tarsal ridge present on distal third of tarsus (32) Outer metatarsal tubercle absent, supernumerary tubercles absent; tarsal tubercle absent.



Fig. 2. *Rana limnocharis* Gravenhorst, 1829, neotype, and *Rana limnocharis* Wiegmann, 1834, neotype. RMNH 4287, young female (SVL 44.4 mm): dorsal view.

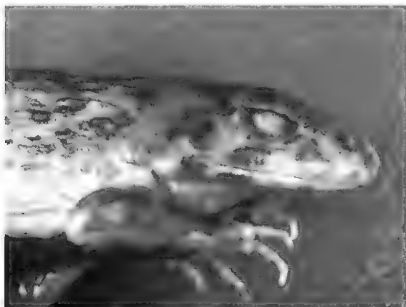


Fig. 3. *Rana limnocharis* Gravenhorst, 1829, neotype, and *Rana limnocharis* Wiegmann, 1834, neotype. RMNH 4287, young female (SVL 44.4 mm): right lateral view of head.

(E) Skin – (33) Dorsal and lateral parts of head and body, snout and between the eyes smooth; side of head with few glandular warts; back and upper part of flanks with glandular folds; lower part of flanks with glandular warts. (34) Latero-dorsal folds absent. (35) Dorsal parts of limbs, forelimbs smooth; thigh and shank with glandular warts; tarsus smooth. (36) Ventral parts of head, body and limbs: throat, chest and belly smooth, thigh with glandular warts. (37) No macroglands.

(F) Coloration in alcohol. – (38) Dorsal and lateral parts of head and body, fawn with a large dirty-white mid-dorsal band and darker brown spots; upper flank coffee brown with darker spots, lower part light fawn, loreal and temporal region fawn with a brown band on canthus rostralis and tympanic fold and brown spots on upper lip; tympanum light fawn with its dorsal half dark brown. (39) Dorsal parts of limbs: forelimbs, thigh, shank and foot fawn with darker bands; posterior part of thigh brown with white marbling. (40) Ventral parts of head, body and limbs: throat, chest, belly and thigh light fawn; margin of throat light fawn white with large brown spots; Fejervaryan line present.

(G) Female sexual characters. (41) Oviduct translucent, folded. (42) Ovaries not observed.

NEOTYPE, BY PRESENT DESIGNATION, OF *RANA CACRIHORA* GRAVENHORST, 1829 (FIG. 4-5)

FMNH 256688 (field number MV40), adult male, collected by Michael Veith on 5 February 1993 at Cianjur (06°49'S, 107°08'E), West Java, Java (Indonesia).

(A) Size and general aspect. (1) Specimen of rather large size (SVL 68.2 mm), body rather slender.

(B) Head. (2) Head of medium size, narrower (HW 26.0 mm) than long (HL 29.7 mm, MN 27.2 mm; MFE 21.3 mm; MBE 15.6 mm), slightly convex. (3) Snout oval, protruding, its length (SL 10.9 mm) longer than horizontal diameter of eye (EL 7.7 mm). (4) Canthus rostralis rounded, loreal region concave, obtuse. (5) Interorbital space flat, smaller (IUE 3.3 mm) than upper eyelid (UEW 5.5 mm) and internarial distance (IN 4.4 mm); distance between front of eyes (IFE 9.9 mm) more than one half of distance between back of eyes (IBE 15.8 mm). (6) Nostrils oval, with small lateral flap, closer to tip of snout (NS 5.4 mm) than to eye (EN 6.9 mm). (7) Pupil rounded. (8) Tympanum (TYD 4.8 mm) distinct, oval, horizontal, about two thirds of eye diameter, tympanum-eye distance (IYE 2.7 mm) about half its diameter. (9) Pineal ocellus present, between anterior quarter of eyes. (10) Vomerine ridge present, bearing a few small teeth, between choanae, with an angle of 45° to body axis, closer to choanae than from each other, longer than distance between them. (11) Tongue large, cordate, emarginate. (12) Supratympanic fold distinct, from eye to shoulder. (13) Parotoid glands absent. (14) Cephalic ridges absent. (15) Co-ossified skin absent.

(C) Forelimbs. (16) Arm short, rather thin (FLL 15.8 mm), slightly longer than hand (HAL 15.3 mm), not enlarged. (17) Fingers rather long, thin (TFL 7.9 mm). (18) Relative length of fingers, shortest to longest II < IV < I < III. (19) Tips of fingers pointed. (20) Fingers II and III with dermal fringe, webbing absent. (21) Subarticular tubercles prominent, rounded, single, all present. (22) Prepollex oval, indistinct, palmar tubercles indistinct, supernumerary tubercles absent.



Fig. 4 – *Rana cancrivora* Gravenhorst, 1829, neotype, FMNH 256688, adult male (SVL 68.2 mm) dorsal view

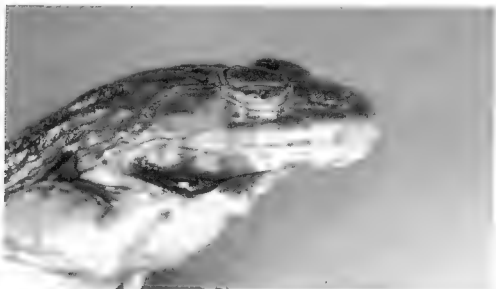


Fig. 5 – *Rana cancrivora* Gravenhorst, 1829, neotype FMNH 256688, adult male (SVL 68.2 mm) right lateral view of head

(D) Hindlimbs. – (23) Shank about three times longer (IL 35.7 mm) than wide (TW 12.9 mm), longer than thigh (FL 33.6 mm), but shorter than distance from base of internal metatarsal tubercle to tip of toe IV (FOL 37.8 mm) (24) Toes long, thin; toe IV long (FTL 21.6 mm), more than one third of distance from base of tarsus to tip of toe IV (TFOL 52.9 mm). (25) Relative length of toes, shortest to longest. $I < II < V < III < IV$ (26) Tips of toes pointed. (27) Webbing moderate: $I\ I - 1\ \frac{1}{2}\ II\ I - 2\ III\ I - 2\ IV\ 2 - 1\ V$ (WTF 7.0 mm, WFF 7.3 mm, WI 6.7 mm, WII 5.3 mm). (28) Dermal fringe along toe V present, from tip of toe to base of metatarsus, well developed. (29) Subarticular tubercles prominent, oval, simple, all present. (30) Inner metatarsal tubercle oval, prominent, its length (IMT 3.7 mm) less than 2.5 times length of toe I (ITL 8.8 mm) (31) Inner tarsal ridge present on distal $\frac{2}{3}$ of tarsus. (32) Outer metatarsal tubercle absent, supernumerary tubercles absent; tarsal tubercle absent.

(E) Skin. – (33) Dorsal and lateral parts of head and body: snout and between the eyes shagreened; side of head with small glandular warts; back and upper part of flanks with glandular folds, lower part of flanks with glandular warts (34) Fine, narrow, interrupted latero-dorsal folds on $\frac{2}{3}$ of back (35) Dorsal parts of limbs: forelimbs, thigh, shank and tarsus with glandular warts and folds. (36) Ventral parts of head, body and limbs: throat, chest and belly smooth. (37) No macroglands.

(F) Coloration in alcohol. – (38) Dorsal and lateral parts of head and body, brown with indistinct darker brown spots around the folds, canthus rostralis and tympanic fold of same brown color; tympanum brown with inferior half clearer, lighter than head, three wide bands from eye to upper lip, a wide light brown mid-dorsal band continuous from tip of snout to vent. (39) Dorsal parts of limbs: forelimbs, thigh, shank and foot brown with darker bands; posterior part of thigh dark brown with white marbling. (40) Ventral parts of head, body and limbs: throat light brown with dark brown vocal sacs on both sides; belly and underside of shank white with indistinct light brown spots; margin of throat white with large brown spots; Fejervaryan line not visible (specimen dissected).

(G) Male sexual characters. – (41) Unique pad of numerous small grey brown nuptial spines on prepollex and finger I. (42) Vocal sacs present.

LECTOTYPE, BY PRESENT DESIGNATION, OF *RANA VITIGERA* WILGMANN, 1834 (FIG. 6-8)

Largest of the two specimens under number ZMB 3269, adult female, collected by F. J. F. Meyen in Laguna de Bay (14°10'N, 121°20'E), Luzon, Philippines.

(A) Size and general aspect. – (1) Specimen rather large size (SVL 68.6 mm), body rather slender.

(B) Head. – (2) Head of medium size, narrower (HW 21.6 mm) than long (HL 24.6 mm, MN 21.1 mm, MFE 16.0 mm, MBE 9.8 mm), convex. (3) Snout oval, protruding, its length (SL 10.1 mm) longer than horizontal diameter of eye (EL 7.2 mm) (4) Canthus rostralis rounded, loreal region concave, obtuse (5) Interorbital space flat, smaller (IUE 3.70 mm) than upper eyelid (UEW 5.23 mm) and internarial distance (IN 3.63 mm), distance between front of eyes (IFE 9.5 mm) two thirds of distance between back of eyes (IBE 13.8 mm) (6) Nostrils oval, closer to tip of snout (NS 4.40 mm) than to eye (EN 5.93 mm) (7) Pupil indistinct (8) Tympanum (TYD 4.61 mm) distinct, oval, horizontal, about half of eye diameter.

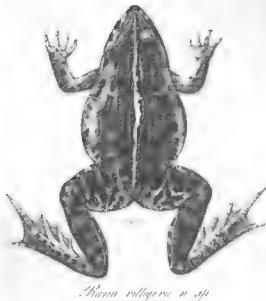


Fig 6 - *Rana vitiagera* Wiegmann, 1834, lectotype, largest of the two specimens under number ZMB 3269; dorsal view (reproduced from fig. 1 of pl. 21 of WIEGMANN, 1834)

tympanum-eye distance (TYE 2.44 mm) about half its diameter. (9) Pineal ocellus present, between anterior border of eyes. (10) Vomerine ridge present, bearing few small teeth, between choanae, with an angle of 45° to body axis, closer to choanae as from each other, longer than distance between them. (11) Tongue not observed. (12) Supratympanic fold distinct, from eye to shoulder. (13) Parotoid glands absent. (14) Cephalic ridges absent. (15) Co-ossified skin absent.

(C) Forelimbs. - (16) Arm short, rather thin (FLL 12.6 mm), about as long as hand (HAL 12.3 mm), not enlarged. (17) Fingers rather long, thin (TFL 7.0 mm). (18) Relative length of fingers, shortest to longest: $IV < I < III$. (19) Tips of fingers pointed. (20) Fingers without dermal fringe, webbing absent. (21) Subarticular tubercles prominent, rounded, single, all present. (22) Prepollex oval, indistinct, two oval, flat palmar tubercles; supernumerary tubercles absent.

(D) Hindlimbs. - (23) Shank three times longer (TL 31.4 mm) than wide (TW 11.4 mm), thigh (FL not measured, femur broken) about distance from base of internal metatarsal tubercle to tip of toe IV (FOL 31.6 mm). (24) Toes rather short, thin; toe IV long (FTL 11.9 mm), less than one third of distance from base of tarsus to tip of toe IV (TFOL 46.5 mm). (25) Relative length of toes, shortest to longest: $I < II < V = III < IV$. (26) Tips of toes pointed. (27) Webbing extensive: $I 0 \quad II 0 \quad I \rightarrow III 0 \quad I \rightarrow IV 1 \frac{1}{2} \quad 0 V$ (WTF 8.3 mm, WTF 6.6 mm).



Fig 7. —*Rana vittigera* Wiegmann, 1834, lectotype, largest of the two specimens under number ZMB 3269, adult female (SVL 68.6 mm): dorsal view



Fig 8. —*Rana vittigera* Wiegmann, 1834, lectotype, largest of the two specimens under number ZMB 3269, adult female (SVL 68.6 mm), right lateral view of head

WI 7.2 mm, WII 4.8 mm; MTF 16.6 mm; MTF 17.4 mm; TTF 12.9 mm; FTF 13.8 mm). (28) Dermal fringe along toe V present, from tip of toe to base of metatarsus, slightly developed. (29) Subarticular tubercles prominent, oval, simple, all present (30) Inner metatarsal tubercle short, very prominent; its length (IMT 2.23 mm) more than 3.5 times in length of toe I (ITL 8.16 mm). (31) Inner tarsal ridge absent. (32) Outer metatarsal tubercle absent; supernumerary tubercles absent; tarsal tubercle absent.

(E) Skin - (33) Dorsal and lateral parts of head and body, snout and between the eyes smooth; side of head with few glandular warts, back and upper part of flanks with short and long glandular folds (the longest half of length of back); lower part of flanks with faded glandular warts. (34) Latero-dorsal folds absent. (35) Dorsal parts of limbs: forelimbs smooth; thigh with glandular warts and horny spinules; shank and tarsus smooth (36) Ventral parts of head, body and limbs: throat, chest and belly smooth, thigh with glandular warts. (37) No macroglands.

(F) Coloration in alcohol - (38) Dorsal and lateral parts of head and body brown with large, dense darker brown, rounded, confluent spots; light mid-dorsal line, slightly broadened to the right in the mid of the back, shoulder pads continued by a clear band on the flanks; three dark spots on upper lip, canthus rostralis and tympanic zone dark brown. (39) Dorsal parts of limbs, forelimbs, thigh, shank and foot brown with outlines of darker bands, posterior part of thigh dark brown with white marbling. (40) Ventral parts of head, body and limbs: throat, chest, belly and thigh dirty white; margin of throat with some brown spots, Fejervaryan line present.

(G) Female sexual characters. (41) Oviduct large, folded (42) Ovaries with small brown and whitish eggs.

HOLOTYPE, BY MONOTYPY, OF *RANA GRACILIS* WIEGMANN, 1834 (NEC GRAVENHORST, 1829) AND NEOTYPE, BY PRESENT DESIGNATION, OF *RANA MULTISTRIATA* HALLOWELL, 1861 (FIG. 9-10)

ZMB 3255, adult male, collected by F J F Meyen near "Cap Syng-more", now Kap Shui Mun (22°21'N, 114°03'E), Lantau Island, Hong Kong, China

(A) Size and general aspect - (1) Specimen of rather small size (SVL 33.0 mm), body rather slender

(B) Head - (2) Head of medium size, longer (HL 12.6 mm) than wide (HW 10.0 mm; MN 10.8 mm, MFE 8.2 mm, MBE 4.4 mm), convex. (3) Snout oval, slightly protruding, its length (SL 5.44 mm) longer than horizontal diameter of eye (EL 4.61 mm) (4) Canthus rostralis rounded, loreal region concave, obtuse (5) Interorbital space flat, smaller (IUC 1.73 mm) than upper eyelid (UEW 2.74 mm) and internarial distance (IN 2.33 mm), distance between front of eyes (IFE 5.5 mm) more than two thirds of distance between back of eyes (IBE 7.6 mm) (6) Nostrils oval, closer to tip of snout (NS 2.00 mm) than to eye (EN 2.80 mm) (7) Pupil rounded (8) Tympanum (TYD 2.04 mm) distinct, oval, horizontal, about half of eye diameter, tympanum-eye distance (TYE 0.67 mm) about one third its diameter. (9) Pinal ocellus absent (10) Vomerine ridge present, bearing few small teeth, between choanae, with an angle of 45° to body axis, less close to choanae than from each other, longer than distance

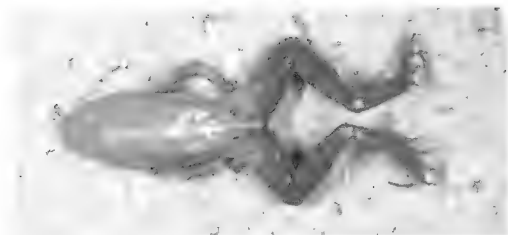


Fig. 9 - *Rana gracilis* Wiegmann, 1834, holotype, and *Rana multistriata* Hallowell, 1861, neotype, ZMB 3255, adult male (SVL 33.0 mm): dorsal view



Fig. 10 - *Rana gracilis* Wiegmann, 1834, holotype, and *Rana multistriata* Hallowell, 1861, neotype, ZMB 3255, adult male (SVL 33.0 mm): right lateral view of head.

between them. (11) Tongue not observed. (12) Supratympanic fold indistinct, from eye to shoulder. (13) Parotoid glands absent. (14) Cephalic ridges absent. (15) Co-ossified skin absent.

(C) Forelimbs. - (16) Arm short, rather thin (FLL 6.4 mm), shorter than hand (HAL 7.5 mm), not enlarged. (17) Fingers long, thin (TFL 4.33 mm). (18) Relative length of fingers, shortest to longest: $IV < II < I < III$. (19) Tips of fingers rounded. (20) Fingers without dermal fringe, webbing absent. (21) Subarticular tubercles prominent, rounded, single, all present. (22) Prepollex oval, prominent; one round, distinct internal palmar tubercle beside a very small external palmar tubercle; supernumerary tubercles absent.

(D) Hindlimbs. (23) Shank four times longer (TL 15.8 mm) than wide (TW 3.5 mm), longer than thigh (FL 14.1 mm), but shorter than distance from base of internal metatarsal tubercle to tip of toe IV (FOL 17.5 mm). (24) Toes long, thin; toe IV long (FTL 10.6 mm), more than one third of distance from base of tarsus to tip of toe IV (TFOL 26.0 mm). (25) Relative length of toes, shortest to longest: $I < II < V = III < IV$. (26) Tips of toes rounded. (27) Webbing moderate: $I - II$ 1, $II - III$ $1\frac{1}{2}$, $III - IV$ $2\frac{2}{3}$, $IV - V$ 1 (WTF 3.35 mm, WFF 3.21 mm; WI 3.10 mm, WII 2.37 mm, MITF 8.65 mm, MTF 8.86 mm; TTF 7.74 mm; FTF 8.51 mm). (28) Dermal fringe along toe V present, from tip of toe to base of metatarsus, scarcely developed. (29) Subarticular tubercles prominent, oval, simple, all present. (30) Inner metatarsal tubercle very short, very prominent, its length (IMT 1.16 mm) almost 4 times in length of toe I (ITL 4.44 mm). (31) Inner tarsal ridge absent. (32) Outer metatarsal tubercle absent; supernumerary tubercles absent; tarsal tubercle absent.

(E) Skin. - (33) Dorsal and lateral parts of head and body smooth and between the eyes smooth; side of head with few glandular warts, back and upper part of flanks with rather short glandular folds (the longest about size of eye-length), lower part of flanks almost smooth. (34) Latero-dorsal folds absent. (35) Dorsal parts of limbs forelimbs and thigh smooth, shank and tarsus with horny spinules. (36) Ventral parts of head, body and limbs: throat, chest and belly smooth, thigh with glandular warts. (37) No macroglands.

(F) Coloration in alcohol. (38) Dorsal and lateral parts of head and body colours faded, brown with a large clearer mid-dorsal band and darker brown spots; shoulder spots indistinct; four brown spots on each side of upper lip. (39) Dorsal parts of limbs forelimbs, thigh, shank and foot with dark bands; posterior part of thigh brown with white net forming a light longitudinal line on the back side of each thigh. (40) Ventral parts of head, body and limbs chest, belly and thigh dirty white, greyish spots on side of throat continuous in the middle; margin of throat beige white with large brown spots. Fejervaryan line present.

(G) Male sexual characters. (41) Nuptial spines present, one single patch on prepollex and finger I numerous, very small, cream-coloured spines. (42) Vocal sacs present, greyish, folded skin on the two sides of the throat, slit-like openings in posterior part of mouth floor. (43) Fine horny spinules on the anterior border of the throat.

RÉSUMÉ

Une analyse détaillée du statut nomenclatural de l'espèce nominale *Rana lunocharis* montre qu'elle a été rendue disponible pour la première fois par GRAVENHORST (1829), puis

une deuxième fois indépendamment par WIEGMANN (1834). Les conséquences de ces faits en ce qui concerne les types porte-noms de ces deux espèces nominales sont discutées et des néotypes sont désignés pour celles-ci. Le statut des espèces nominales suivantes, voisines de *Rana lunnocharis*, est aussi discuté et leurs spécimens-types sont décrits: *Rana cancrivora* Gravenhorst, 1829; *Rana vittigera* Wiegmann, 1834, *Rana gracilis* Wiegmann, 1834; *Rana multistriata* Hallowell, 1861; *Rana wasi* Annandale, 1917. Finalement, sur la base de plusieurs informations récentes, il est suggéré que le groupe de grenouilles habituellement désigné comme "groupe de *Rana lunnocharis*" ou "sous-genre *Fejervarya*" devrait être reconnu comme un genre distinct, *Fejervarya* Bolkey, 1915.

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